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spores on the plants sent me by Mrs. Britton I found them to agree exactly in size and rough surface with my plant and that from Italy, but that instead of being 17–22μ as Limpricht records, p. 225 of Vol. I., they are uniformly a little larger, measuring 26–30μ.

What I have now stated will make clear why I think Hooker and Wilson were probably right when they referred our American plants to *H. rostellatum* to which Lesquereux and James did not agree, retaining Sullivant's name (see the Manual, p. 52, under *A. Ludovicianum*). To be sure Limpricht in his historical sketch tells us that *Hymenostomum rostellatum* may also be conceived as an *Astomum* (referring to the European form) which illuminates Hooker and Wilson's name *Phascum crispum rostellatum*, but judging from his practice (See Vol. I., p. 224) he himself considers it a *Hymenostomum*. According to this view *Astomum* (or *Systegium*) *Ludovicianum* Sulliv. becomes a synonym of *Hymenostomum rostellatum* (Brid) Schimp., in addition to the list given by Limpricht. On the other hand if the plant is to be referred to the genus *Astomum* Hampe., or *Systegium* Schimp., where it may stand with perfect propriety, since here also the lid is "distinctly formed but not easily detached," it should be called: *Astomum rostellatum* Bry. Eur., or *Systegium rostellatum* Boulay in Muscinees del Est., p. 586 (1872).

That Hooker and Wilson referred the plant to *Phascum* (*Astomum*) *crispum* as a variety, is very suggestive of the close similarity of the vegetative organs, and a look at Limpricht's synonyms of the European form, ever since Bridel described it as a Phascum, is sufficient to show its ambiguous position. The frequently clustered capsules of the species are referred to, both by Limpricht and in Lesquereux and James, and the somewhat more vigorous and branching habit of Sullivant's plants is purely local, judging from the several American specimens examined. The difference in length of operculum, the European plant being on the whole a little longer beaked, is not emphasized either in plate 12, Bry. Eur., or in Sullivant's Icone, plate 12, a comparison of which shows how slight is this difference, so slight indeed that one would not care to base even a variety on it.

Winona, Minn.

(Taken from Minnesota Botanical Studies as Reprinted July 3, 1903.)

THE MOSS FLORA OF THE UPPER MINNESOTA RIVER BY JOHN M. HOLZINGER.

A. J. Grout.

This is an interesting report based on collections made under the auspices of the Minnesota Botanical Survey and lists ninety-six species, of which nearly one-half are new to the State, including six new species, five of which are by Cardot and Theriot Two of these new species are forms confessedly near Hypnum riparium, That the polymorphous riparium might be segregated into several fairly well defined groups is almost certain, but it hardly seems worth while, from a scientific point of view, to found new species on specimens from a single collection or two collections from neighboring localties even.

Following are the descriptions of the new species translated from the Latin. These descriptions of all the species are accompanied by good illustrations.

BRYUM MINNESOTENSE Card. & Ther.

Dioicous, densely cespitose: stems 5-10 mm. high, erect, radiculose, with numerous innovations; stem leaves erect-open when moist, appressed when dry, about 2 by 1-1.5 mm., ovate-lanceolate, short acuminate, entire or denticulate at apex, costa excurrent, margins revolute from base to apex; basal leaves larger, longer acuminate, somewhat twisted when dry: basal cells hyaline, elongated rectangular, median and upper short-hexagonal, strongly chlorophyllose, marginal linear in 4-5 rows forming a distinct border. Seta 2-2.5 mm. long, usually bent at base; capsule subhorizontal or cernuous, oblong-pyriform with a long plicate neck when dry; operculum conic; annulus broad, exostome as in *B. pendulum*, 0.36 mm. high, inner lamellæ anastomosing. Endostome adherent, cilia not appendiculate. Spores 19-20μ. Antheridial plants unknown.

Differs from *B. pendulum* by its narrower, longer capsule, provided with a longer neck, longer cilia and dioicous inflorescence.

At Granite Falls (June 13, 14, 1901).

BRYUM HOLZINGERI Card. & Ther.

Closely related to the preceding from which it differs in the synoicous inflorescence, leaves narrower at base with margin less longly revolute, plane above, acumen longer, more distinctly denticulate at apex, median cells about twice longer, margin broader, composed of 6-7 rows of cells. Capsule longer and narrower for its length.

The longer and narrower capsule distinguishes this species from *B. pendulum*.

At Cedar Lake (June 18), Hartford (June 27) Foster (June 29, 1901).

CATHARINAEA MACMILLANI Holz.

Dioicous, archegonial heads only found. Plants not branching, reaching 2 cm. in length; leaves involute and circinate when dry, erect-open when moist, margin bistratose and constructed of two rows of cells, serrate with paired teeth; lamellæ 7-10, 8-12 cells high, the terminal cell lightly papillose. Other characters not known.

This species is at once distinguished by its papillose leaves. It is dedicated to Prof. Conway MacMillan, director of the Minnesota Botanical Survey. On ground near Ortonville (June 25, 1901).

NOTE—The original spelling of the generic name is *Catharinaea*, not *Catharinea.*

FONTINALIS OBSCURA Card.

Plants rather soft, obscurely green to dark green, blankish below, stems 10-15 cm. high, flexuous, denuded at base, irregularly or pinnately branched, branches patent to patulous, obtuse or short cuspidate; leaves rather densely foliate, slighly concave, rather soft erecto-patent, imbricated at the apex of stems and branches, fragile, often ragged or broken off, stem leaves ovate to oblong-lanceolate, obtuse or short acuminate, entire 3–3 5 by 0.9–1.2 mm., branch leaves narrower, 2.1–3.5 by .6–.85 mm.; alar cells subquadrate or oblong, not strongly differentiated, others linear, subflexuous, upper shorter, all chlorophyllose. Other characters unknown.

Seems to be related to *F. Novae-Angliae* Sulliv., but readily distinguished from this species by the leaves (chiefly the branch leaves) which are narrower, longer acuminate, entire at apex, and by the much smaller and less distinct alar cells. It belongs to the section *Heterophyllae.*

In the Minnesota River Channel, at Granite Falls (July 12, 1901).

AMBLYSTEGIUM BRACHYPHYLLUM Card & Ther.

Related to *A. riparium* from which it differs in its shorter ovate-lanceolate leaves, 1-6–1.7 by 0.7 mm., short acuminate, apex obtuse or subobtuse; costa strong, broader at base, 50–80μ wide, extending 2/3 or 3/4 the length of leaf; median cells linear, 70–90μ. Fruit unknown.

By the blunt or subobtuse acumen this moss resembles *A. vacillans* Sulliv., but it has much shorter and broader leaves. From *A. brevipes* Card. & Ther., it is well distinguished by the larger size, the blunt acumen, the longer and narrower cells, and the stronger costa. The polymorphous *A. riparium* constitutes a vast group of forms, some of which are constant enough and are sufficiently characterized to be considered as secondary or tertiary species; such are *A. Kochii* B. & S., *A. vacillans* Sulliv., *A. brachyphyllum* and *A. brevipes* Card. & Ther., *A. floridanum* Ren. & Card., and probably *A. argillicola* Lindb.

Granite Falls (July 15, 1901),

AMBLYSTEGIUM BREVIPES Card. & Ther.

In the *A. riparium* section of the genus; stems slender, creeping, branches short, leaves erect-open, about 1.2 by 0.6 mm., broadly ovate, short-acuminate, entire; costa narrow, 30μ wide at base, vanishing beyond the middle, often extending 2/3–3/4 the length of the leaf; areolation lax, basal cells rectangular, some quadrate, median subhexagonal, 55–70 by 12–15μ, upper shorter and broader; perichaetial leaves broadly ovate, suddenly narrowed into a slender acumen, often irregularly denticulate at base of acumen; costa extends beyond the middle; seta short, capsule oblong-arcuate, constricted under the mouth when dry; operculum conic.

This species differs from small forms of *A. riparium* by the shortly acuminate leaves, the looser areolation, the shape of the perichaetial leaves, and the short pedicel. A species from the Caucasus, *A. argillicola* Lindb., of which we know only the description published by Dr. V. F. Brotherus in his valuable paper, "Enumeratio Muscorum Caucasi," seems to be nearer to this species but still stands distinct from it by its leaves which are minutely denticulate from almost the base, its longer costa vanishing below the apex, and its narrower perichaetial bracts, with a less distinct nerve.

Near Montevideo (June 15, 1901); Hartford (June 27, 1901).